

# Laser Misting Measuring Unit

## Owner's Manual

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## 1. Laser Misting Measuring Unit objectives

The Novomatics **Laser Misting Measuring Unit** allows automated misting evaluation of printing inks at a high degree of accuracy and reproducibility. It operates in combination with AlphaTack Plus or LithoTack II and is so part of Novomatics modular printing ink measuring system.

Due its automatic controlled test conditions the laser-based methodology offers significant advantages over the usual misting testing methods, like visual observation of white papers or vacuum cleaning filters. It is an objective, quantitative method and so independent of the operator.

Features:

- quantifies flying ink droplets in real-time
- integration into standard tack tests of AlphaTack Plus or LithoTack II
- misting results are printed in same report like tack results
- operator independent, fully automated measuring system
- stable measurements over the lifetime of the instrument
- accurate, reliable and easy to operate
- cost savings because of no extra operator time and accurate measurements
- usually no cleaning needed, but if so, done within a few seconds
- space saving, compact design
- easy installation by “plug and play”
- ideal for QC and R&D
- ideal for use outside of the laboratory

## 2. Importance of ink misting measurement for the printing ink industry

### 2.1. What is ink misting?

Ink misting is the sum of flying ink droplets ejected on nip outlets of rotating press rollers. It is a direct effect of the ink film splitting process happening on roller nip outlets.

An ink film splits under creation of filaments on roller nip outlet. When these filaments split on more than one-point free ink volumes form free droplets. These release the rotating rollers as spray or mist. Longer inks create longer filaments and have so a higher tendency to mist than shorter inks. So the ink misting is directly affected by rheological and adhesive ink properties and the internal cohesion of the ink itself.

Of course ink misting is an undesired property of the printing ink. Ink misting leads to higher air pollution, higher cleaning effort and higher ink consumption. In other words ink misting hazards the health of workers and creates unnecessary operational costs. **Ink misting has to be minimized.**

Ink misting increases with higher press speeds. Nowadays speeds of 10 m/s – 15 m/s are standard which is leading to higher challenges to the ink manufactures to optimize their products for minimized misting, too.

### 2.2. What are the current methods of ink misting determination?

Misting indications are possible in laboratory already. Until now there are two main methods in combination with fast rotating rollers of tack measuring instruments.

Mainly a blank page of paper is placed near to the nip outlet. After the run with ink under test the page is evaluated for contamination by the operator. This subjective method leads to higher variations by different operators, may be up from ambient light and takes time.

A further method is a vacuum cleaner arrangement which entry is placed close to the nip outlets. At the end of test the operator evaluates the vacuum cleaning filter for ink contamination. This has similar disadvantages like the method described before. Certain variations by different operators, ambient light dependencies and extra time for preparation and cleaning of the vacuum cleaner arrangement.

Summarized the previous methods are time consuming because of subjective factor, low accurate and do not enable the integration into an automated ink measuring system.

### 2.3. Operation principle of Laser Misting Measuring Unit

The new Novomatics Laser Misting Measuring Unit overcomes the principal problems of the current subjective methods.

A laser beam is placed close to roller nip. Ink droplets which are passing that beam reflect its light. A photocell array nearby receives that reflected light.

The Laser Misting Measuring Unit is able to quantify the droplets concerning their number and size. All necessary calculations are performed in real-time resulting in a misting representing parameter. This parameter is recorded and reported like other ink related parameter.

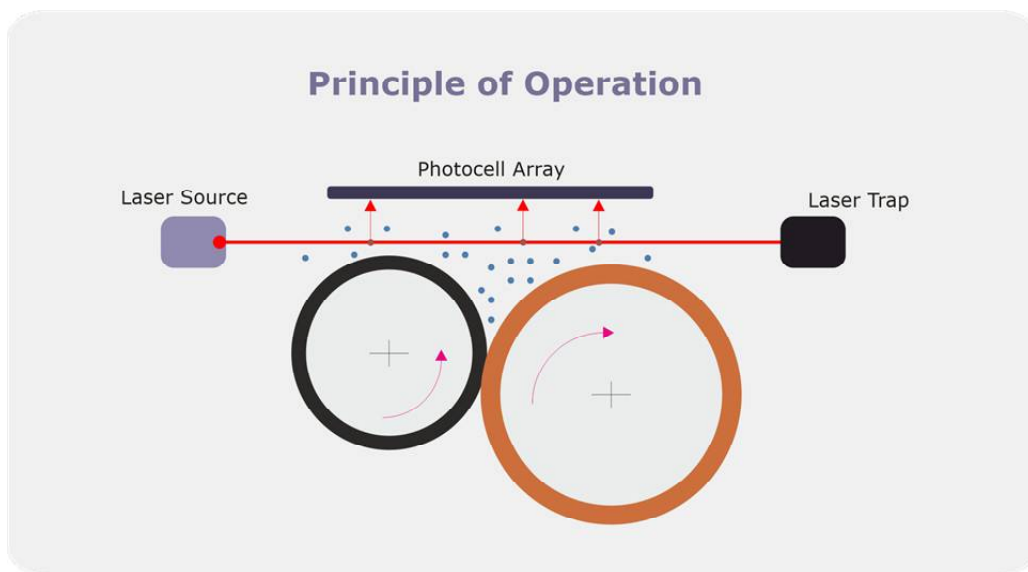


Figure 1 Principle of Operation

The laser beam is modulated by a unique signature. That's why only the light that contains that signature is considered by the light receiver. The light of other sources in ambient is actively cancelled.

For operators' safety the laser power is very low. Further it is stopped into a laser trap and so it is impossible to be exposed to.



Figure 2 Design of measuring lever



Figure 3 Measuring lever in horizontal position applied to AlphaTack

## 3. Getting Started

### 3.1. Safety Precautions

**Read this note before the instrument will be taken into operation!**

Before connecting the Laser Misting Measuring Unit to the power supply:

- Ensure that the MAINS switch at the rear panel is in off position.
- Ensure that the power voltage of your mains socket corresponds with the power voltage of the instrument.
- Ensure that the power cable plug is connected only to a power socket that has a protective earth contact. This applies equally, if an extension cable is used: the cable must contain an earth conductor!
- To effect grounding of the instrument case, the power plug must be inserted before the USB connection is made to the PC. The power plug must remain connected until all other units have been connected or disconnected.
- Any interruption of the ground connection (inside or outside the instrument) is prohibited.
- The instrument must be disconnected from all voltage sources before it is opened for any adjustment, replacement or repair. The manufacturer does not take any responsibility for any adjustments, maintenance by the user. Consult [NOVOMATICS](#), if repairs are necessary.

Whenever it is likely that the safety of the instrument has been impaired, it should be made inoperative and secured against any unintended operation. Safety could be impaired if:

- Any case or cable shows visible damage.
- The instrument fails to perform the intended operation.
- It has been subjected to prolong under unfavorable storage conditions.
- It has been subjected to severe transport stress.

## 4. Installation

### 4.1. Software installations

The Laser Misting Measuring Unit requires the latest WinAlphaTack V 3.00 software version.

Before starting make sure that the instrument is off and the instrument cable is not connected to the computer.

#### 4.1.1. Installation of WinAlphaTACK V 3.00 software from USB flash drive

1. Insert the installation USB flash drive WinAlphaTack
2. Start the program **winalphatacksetup.exe**
3. Follow the default adjustments by pressing **Next**

#### 4.1.2. Installation of WinAlphaTACK V 3.00 software from Internet

1. When not available ask Novomatics for actual download link
2. Download **winalphatacksetup.exe** and execute it
4. Follow the default adjustments by pressing **Next**

#### 4.1.3. Installation of Laser Misting Measuring Unit device driver

There is no need to install a specific USB driver since the same driver is used like for AlphaTack Plus or LithoTack II.



## 4.2. Setting up the Laser Misting Measuring Unit

Place the Laser Misting Measuring Unit like left-aligned to AlphaTack Plus or LithoTack II as shown below. Note the fronts and so also the rear sides of both instruments have to be in line.



Figure 4 Measuring lever in vertical position

### 4.2.1. Instrument cables and connections

The AlphaTackPlus measuring system needs only a main cable and a USB cable. If any damage is detected exchange the hose/cable before the instrument is taken in further operation. In case of doubt [contact](#) your supplier or Novomatics (please refer to page 21)

#### 4.2.1.1. Main's cable

Please only use cable from the manufacturer. These are tested and delivered in mechanical stable version. Your socket must have a secure, electrical ground connection.

#### 4.2.1.2. USB cable

Please only use cable from the manufacturer. These are tested and delivered in mechanical stable version.

#### 4.2.1.3. Switching on the Laser Misting Measuring Unit, Start of WinAlphaTack V 3.00

The Laser Misting Measuring Unit can be switched on, if all connections to the instrument are made. If on the blue power LED is illuminating. In case the measuring lever was not straighten up it is lifted slowly to its vertical position and hold tight there.

Start WinAlphaTack now. The connection to the Laser Misting Measuring Unit is made automatically. You indicate a fine connection when the new **Misting Window** indicate **Laser On** or **Laser Off**.

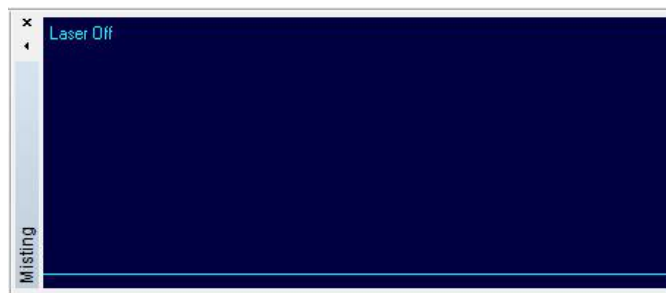


Figure 5 Example plot of misting window when connected to the instrument

After the installation is finished and before starting a first measurement a quick function test should be performed.

### 4.3. Function test

The function test is consisting of two steps.

#### 4.3.1. Activation and Deactivation

Click the right mouse button over the **Misting Window** and click **Activate** then. Now the measuring lever goes to horizontal position. Further the laser is switched on indicated by the red LED on front side.

For deactivation click the checked **Activate** again.

### 4.3.2. Light receiver

Click the right mouse button over the **Misting Window** and click **Laser On** then. Now the laser is switched on which is indicated by the red LED on front side.

Put one of your fingertips slightly into the flour can which is part of delivery. Blow the flour particles of your fingertip directed to the photocell array. Because the **Misting Window** is updated ten times per second, there are instant reactions similar like this:

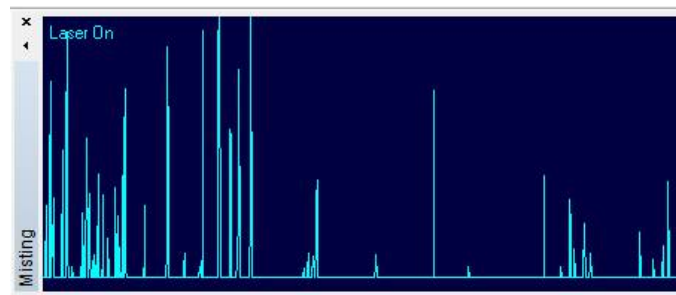


Figure 6 Example plot of misting window when particles are passing the laser beam

Every spike represents a particle. For deactivation click the checked **Laser On** again. If not, the laser is deactivated automatically within 60 s when the measuring lever remains in vertical position.

## 5. Start of a tack and misting measurement

The WinAlphaTack V 3.00 software has been extended for controlling the Laser Misting Measuring Unit and misting data evaluation.

Please follow up chapter 5 of your AlphaTack Plus manual for starting a first tack test.

### 5.1. Program settings for misting

Open the dialog **measurement\programs\steps ...** for checking the program settings of each step. A new switch **activate for misting** is available now. When checked the measuring lever goes to horizontal position and the misting measurement is started.

It should be activated at begin of measuring phase and **not** during distribution phase before. In distribution phase larger filaments are created which may contaminate the photo cell window.

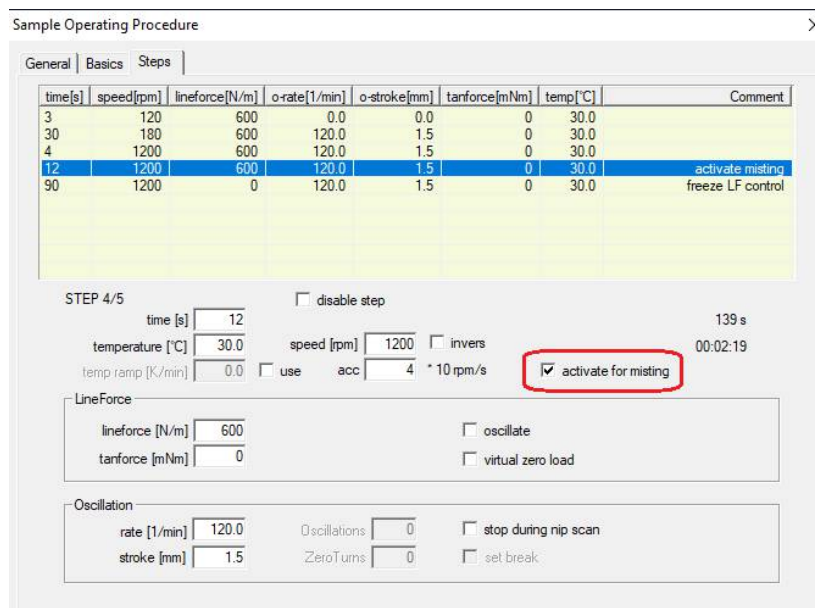


Figure 7 Define the use of misting measurement within the sample operating procedure dialog

The WinAlphaTack V 3.00 is equipped with new report functionality. Already in program settings can be determined which report sheet is preferable applied and optionally printed out at the end of test.

Open the dialog **measurement\programs\basic ...**

Sample Operating Procedure

General Basics Steps

open "sample settings dialog" before start ☐

show step comments in online window ☐

ink dispensation

manual ☐ weight [mg] 100

automated ☒ volume 100 400 rate [1/min]

incremental ☐ steps 10

use IR roller conditioning ☐

use invers Turns ☐ invers Turns 0

pre lineforce [N/m] 200

pre tanforce [mNm] -16

Default

temp stabilization before start

start measurement automatically after temp stabilization ☒

max temp deviation [K] 0.40

max temp gradient [K/min] 0.5

Default

tack acquisition

tack stability table ☐

time shift [s] 0

low filter ☒ Default

tack results in online table according to

first ☐ xxxReading ☒

UVxxxStd ☐ Stability ☐

QC test report

create and open at end of test ☒

scheme according to MistingREPORT.T2D

print out promptly on standard printer ☐

Figure 8 Settings for automatic report creation on the end of test

The MistingReport.T2D scheme is one of the new reports templates which are installed automatically but may be adapted anytime.

## 5.2. Online Process Window

WinAlphaTack V 3.00 is equipped with a new measuring parameter so called **Misting [ ]**. Of course it should be displayed on a further y-axis during a misting test.

Click right mouse button on Online Process Window. Go to Options ... Increase the number of y-axes by one. Go to that y-axis tab and select **Misting [ ]** as parameter of interest. Than your Online Process Window should look similar like below.

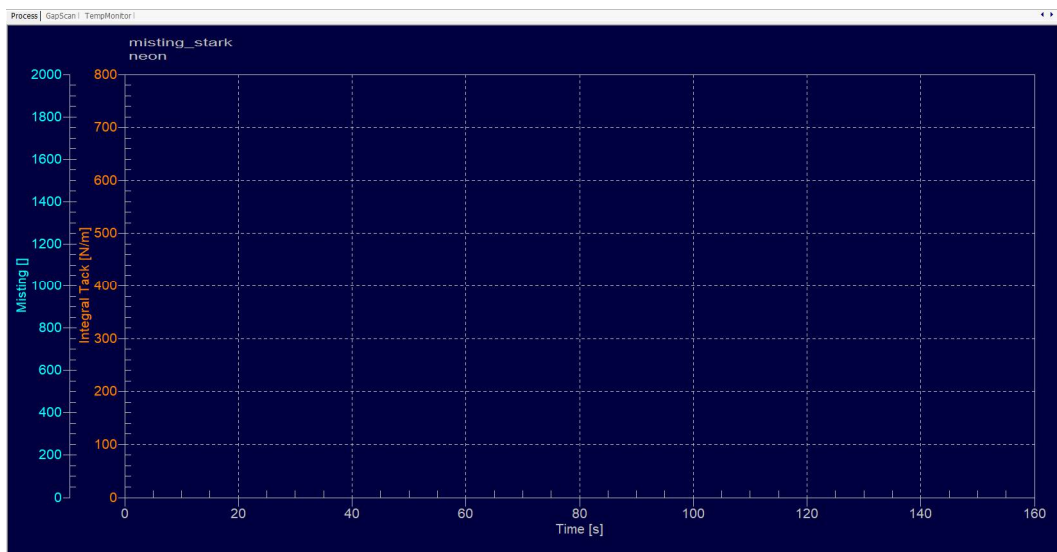


Figure 9 Online Process Window prepared for plot misting parameter

## 6. Cleaning

### 6.1. Photocell array and instrument case

The instrument case is made of anodized aluminum parts and a glass window only that are usually compatible with standard cleaning solvents used into ink laboratories. Especially for the glass covered photocell array take a soft cleaning rag which doesn't fibrillate.

Do not apply a strong force to the glass covered photocell array; the glass is thin, similar as known from a mobile phone.

### 6.2. Cleaning agents

The cleaning agents are not allowed to have non-evaporating ingredients like surfactants or salts.

For conventional inks is highly recommended to use simply petroleum benzine.

For UV Inks a mixture of ethanol and ethyl acetate has been proved to be successful, like:

Wash Up W907, Art.-No.: W907-K042, 25 kgs can

Supplier:

Zeller+Gmelin GmbH & Co. KG, Schlossstraße 20, 73054 Eisligen, Germany

Phone: ++49 7161 802 0, [www.zeller-gmelin.de](http://www.zeller-gmelin.de)

## 7. Data evaluation

Please follow up chapter 7 of your AlphaTack Plus manual for the basics of data evaluation.

### 7.1. Report settings for misting

The WinAlphaTack V 3.00 supports misting reports by a new standard template so called MistingReport.T2D it can be adapted, copied etc at anytime by operator.

In that template there are two settings according misting report. Firstly the standard tack report has been added by a new switch **misting index**. When activated misting information appear on the right tack report, too. Secondly a further y-axis is added, which has been set to **Misting []** parameter.

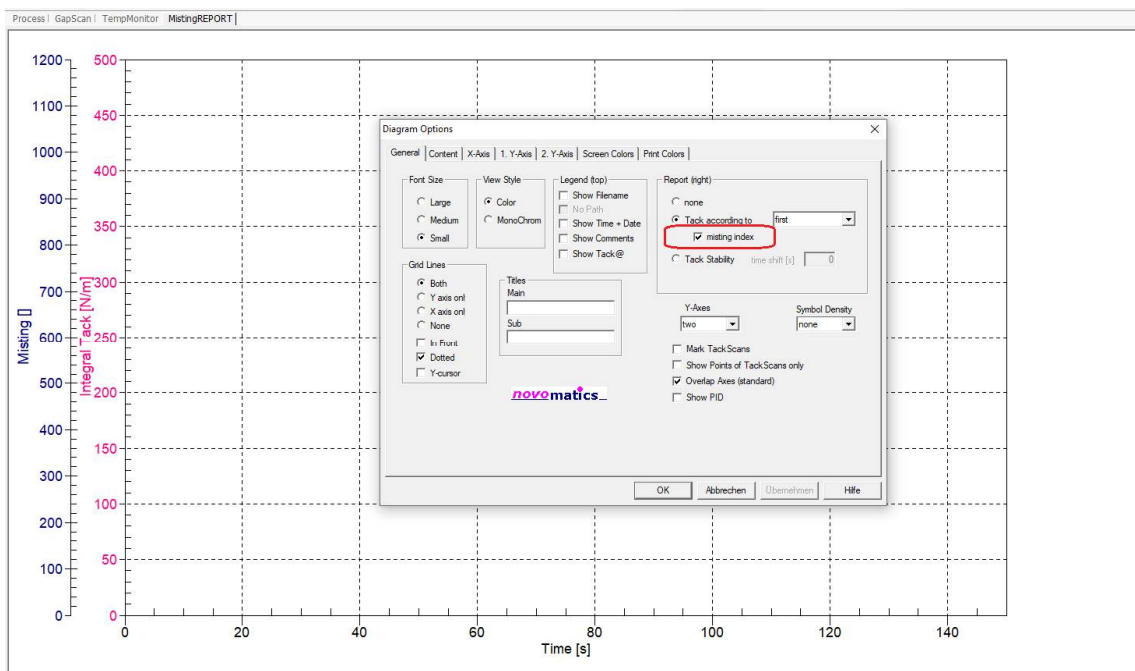


Figure 10 The MistingReport.T2D



7.2. Report examples for misting

There are different misting examples shown below using the MistingReport.T2D as report template.

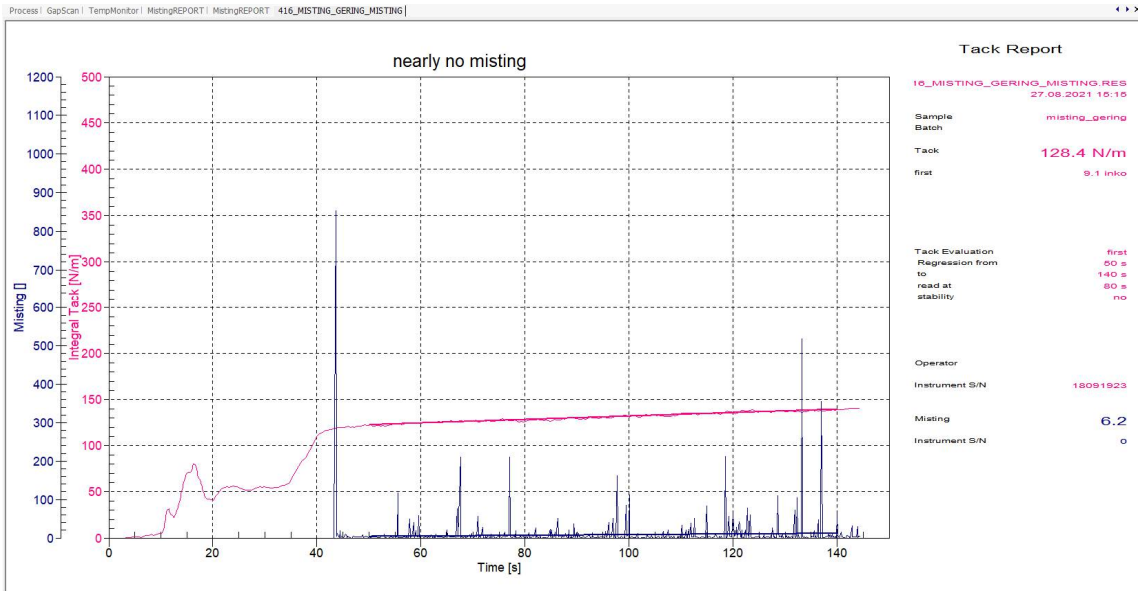


Figure 11 low misting example

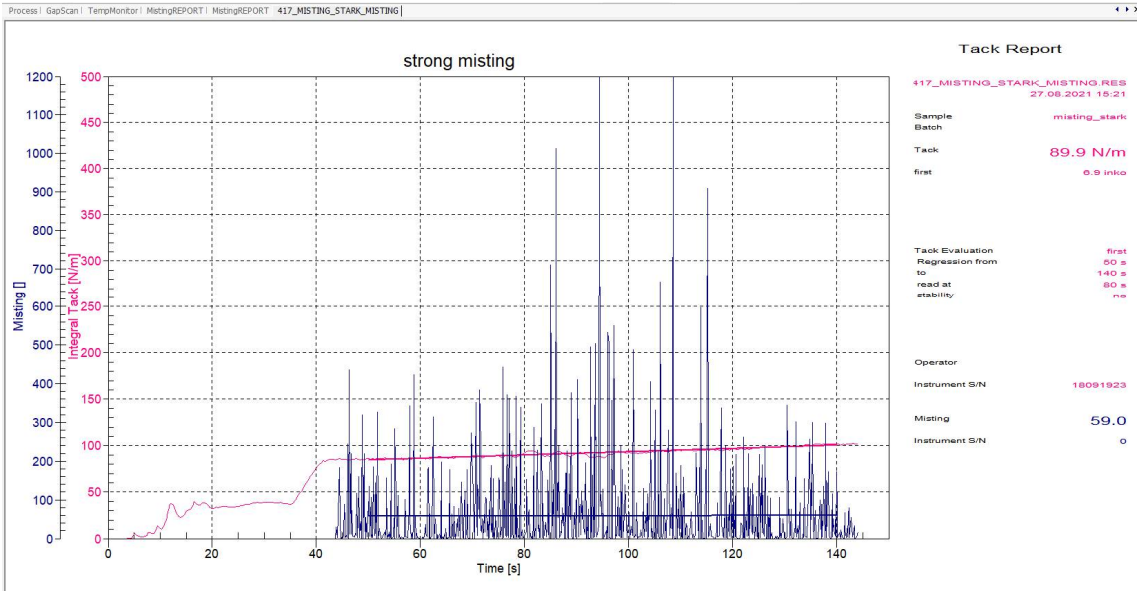


Figure 12 significant misting example

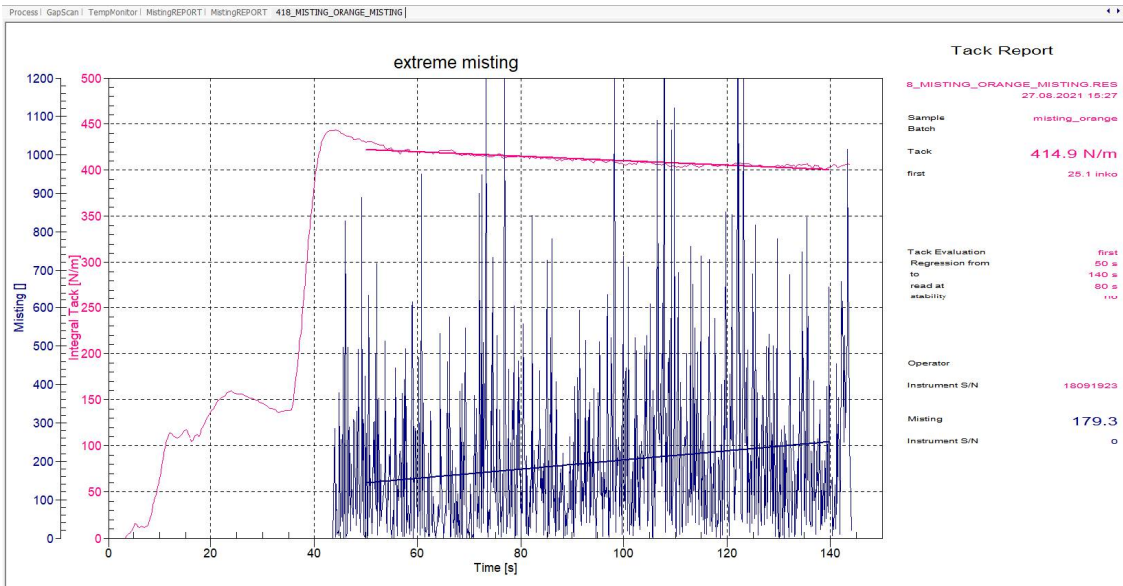


Figure 13 extreme misting example

## **8. Maintenance**

The Laser Misting Measuring Unit instrument was designed for easy maintenance, approval and software update via internet. Periodical maintenance service is not planned. Only in exceptional cases a service technician must inspect the instrument.

In case that any service appears to be necessary, don't hesitate to contact Novomatics. Firstly, Novomatics inspects the instrument via internet. Then - when still required - the next steps are coordinated with instrument user personally.

## 9. Technical specification

### Conception

Laser based misting measuring unit. Robust metal case consisting of anodized aluminum and glass components. Sensitive measurement devices are completely encapsulated. Full automated measurement control by WinAlphaTack PC-software via USB interface.

### Misting Measurement

- by means of modulated laser beam
- high-sensitive photo cell detection unit, locked to laser beam modulation
- dynamic ambient light noise cancellation
- online determination of ink misting as function of speed, line force or water content
- processes simultaneously to standard operation as tack measurement
- software extension for online determination of misting and data evaluation
- operable in combination with AlphaTack Plus or LithoTack II

### Power supply

Operation voltage	100 - 250 V, 50 – 60 Hz
Power consumption	25 VA

### Laser

Power	1 mW (eye save)
Wave length	650 nm

### Dimensions, weight

L x W x H	36 x 13 x 35 ccm (Measuring lever in horizontal position)
Weight	5 kgs

### Computer

Interface to PC	USB 2.0
Operating System	Windows 10 / 11
Software	WinAlphaTACK V 3.00 (provided with the measuring system)

## 10. Contacting Novomatics

Please don't hesitate to contact your local distributor or Novomatics for any further information.

### Europe

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